**Vancouver, Canada** – In their own words, First Authors at the 2019 Annual Meeting of the Association for Research in Vision and Ophthalmology explain their findings. Their abstracts were designated as some of the newest and most innovative research being conducted in various specialties and are being presented on Sunday, April 28. To view abstracts, enter the program number or title in the “Search” field of the [Online Planner](#) or [mobile app](#).

**Clinical/Epidemiologic Research**

5221. Identification of novel serum metabolites associated with intraocular pressure: the Singapore Chinese Eye Study. 3:00 - 3:15pm

This study explored the relationship between metabolic blood constituents and intraocular pressure. Our findings suggested that higher levels of albumin and lipoprotein subclasses were associated with higher IOP. These findings provide insight into the complex interplay between metabolic blood constituents and intraocular pressure.

5224. Genome-wide association study identifies a novel locus associated with strabismus. 3:45 - 4:00pm

Clinical manifestation of strabismus - a neurological disorder of the visual system - is an ocular misalignment, so an eye deviates from its central axis. This disorder affects 2-4% of the population and commonly develops in childhood. The aim of our study was to identify genetic risk factors of strabismus. For that purpose, we searched the association with strabismus among 7,469,170 genetic variants in 66,694 UK Biobank participants. We found that a genetic variant on chromosome 17 in the TSPAN10 gene region increases the risk of strabismus development by approximately 25%. Our findings were confirmed after we repeated the analysis in a cohort of children aged 7 years old. Association of the TSPAN10 gene with strabismus opens a new field of research that will help to clarify the role of genetic risk factors with the development of paediatric eye disorders.

**Genetic Cross-sectional Group**

4249. Genome-wide association study on a large multi-ethnic sample identifies new genetic loci that predispose to keratoconus. 9:00 - 9:15am

Keratoconus affects the cornea (the clear window at the front of the eye) in early adulthood, with subsequent progression. There are approximately 55,000 individuals affected with keratoconus in the UK and an estimated 8 million worldwide. Even with contact lenses patients can be severely visually
impaired and eventually one fifth of patients under hospital review require corneal transplantation. This has a major impact on quality of life and employment opportunities for this patient group. Currently, we understand very little about the cause of keratoconus, which has hampered our ability to develop new strategies to treat this condition at an early stage and preserve vision. Because genetic factors underpin the development of disease it is our goal to determine what these genetic factors are. Identification of genetic risk factors for developing keratoconus is the first essential step towards understanding the cause of disease and improving patient care. Knowledge of the genetic factors involved will eventually lead to screening of at-risk patients, with the ultimate goal of providing treatment to prevent progression of disease.

Retinal Cell Biology

A0188. Investigation of the interaction of Sigma1 Receptor (S1R) and NRF2 in cone photoreceptor cells. 10:15am - 12:00pm

Sight threatening retinal degenerative diseases require novel therapeutic strategies. Our lab has been investigating Sigma 1 Receptor for its robust rescue of cone photoreceptor cells and currently we are exploring mechanisms of this rescue. Our studies suggest that this protein may interact with NRF2, a major regulatory protein of the antioxidant response. In order to interact, proteins must be in close proximity to each other. Using two sophisticated protein detection methods, we observed that within cone photoreceptor cells, Sigma 1 Receptor is frequently located within ~40-50 nm of NRF2. These findings constitute the first evidence that the proteins co-localize thereby providing the basis of future studies to understand whether Sigma 1 Receptor affords photoreceptor rescue by interacting with this key molecular regulator of oxidative stress.

5177. PARP inhibitors: The protective ways on retinal degeneration. 3:45 - 4:00pm

Retinitis pigmentosa (RP) is a family of hereditary eye disorders characterized by progressive retinal degeneration affecting approximately 1 in 4000 individuals. Owing to the lack of rod functionality, patients suffer from night blindness at disease onset followed by secondary cone photoreceptor death leading to progressive visual field constriction, abnormal colour vision, and finally complete blindness. Despite the advancing genetic knowledge, there is no effective cure option to date, presenting an urgent need for developing novel treatment strategies. It was shown that increased Poly-ADP-ribose polymerase (PARP) activity is involved in photoreceptor degeneration and PARP inhibition as potentially beneficial for the course of disease. Currently PARP inhibitors are in clinical trials for cancer and offer rapid therapeutic strategy for some diseases including retinal disease. Repurposing of PARP inhibitors will facilitate a translation into a treatment for inherited diseases of the retina.

Visual Psychophysics/Physiological Optics

A0044. Direct subjective refraction with temporal defocus waves. 8:15 - 10:00am

Optometrists and ophthalmologists assess the visual function of thousands of patients every day, to find the most suitable lens combination to compensate their visual error. They use different lenses in a trial and error process. Unfortunately, this technique takes time (minutes), is affected by accommodation and requires a skilled practitioner interpreting the answers of the patient. In this study, we present a new method to perform Direct Subjective Refraction based on defocus temporal waves, resulting in a faster and more accurate process, not affected by accommodation and not requiring supervision.